Precalc Warm Up # 6 - 4

Factor completely:

1. $3x^2 - 6x - 24$

2. $2x^3 + 5x^2 - 6x - 15$

3. $8x^3 - 27$

4. $18x^4 - 50$

HW Questions: p. 169

In Exercises 1–6, find (a) the distance between the two points, (b) the coordinates of the midpoint of the line segment between the two points, (c) an equation of the line through the two points, and (d) an equation of the circle whose diameter is the line segment between the two points.

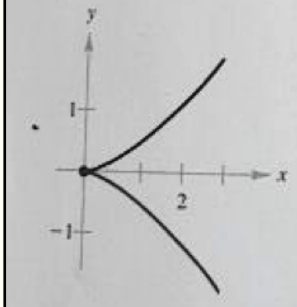
3. (2, 1), (14, 6)

In Exercises 7–10, find t so that the three points are collinear.

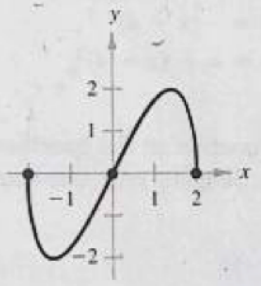
7. $(-2, 5), (0, t), (1, 1)$

In Exercises 15–24, find the intercepts of the given graph and check for symmetry with respect to each of the coordinate axes and the origin.

15. $2y^2 = x^3$



19. $y = x\sqrt{4 - x^2}$



In Exercises 25–28, determine the center and radius of the circle. Then, sketch its graph.

27. $4x^2 + 4y^2 - 4x - 40y + 92 = 0$

$4(x^2 - x + \frac{1}{4}) + 4(y^2 - 10y + 25) = -92 + 1 + 100$

$4(x - \frac{1}{2})^2 + 4(y - 5)^2 = 9$

$(x - \frac{1}{2})^2 + (y - 5)^2 = \frac{9}{4}$ $\quad r = \frac{3}{2}$

center $(\frac{1}{2}, 5)$

In Exercises 29–42, sketch a graph of the equation.

29. $y - 2x - 3 = 0$

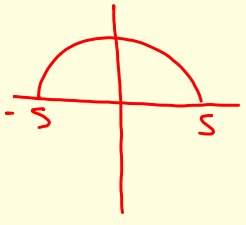
33. $y = \sqrt{5 - x}$

37. $y = \sqrt{25 - x^2}$

$(y)^2 = (\sqrt{25 - x^2})^2$

$y^2 = 25 - x^2$

$x^2 + y^2 = 25$



41. $y = \frac{1}{4}(x + 1)^3$

45. $h(x) = 6 - 5x^2$

b) $h(x + 3)$

d) $\dfrac{h(x + \Delta x) - h(x)}{\Delta x}$

$\frac{1}{\Delta x}[6 - 5(x+\Delta x)^2 - (6 - 5x^2)]$

$\frac{1}{\Delta x}[6 - 5[x^2 + 2x\Delta x + (\Delta x)^2] - 6 + 5x^2]$

$\frac{1}{\Delta x}[6 - 5x^2 - 10x\Delta x - 5(\Delta x)^2 - 6 + 5x^2] = \frac{\Delta x(-10x - 5\Delta x)}{\Delta x}$

In Exercises 47–52, determine the domain of the function.

49. $g(s) = \dfrac{5}{3s - 9}$

In Exercises 53–58, (a) find f^{-1}, (b) sketch the graphs of f and f^{-1} on the same coordinate plane, and (c) verify that $f^{-1}(f(x)) = x = f(f^{-1}(x))$.

55. $f(x) = \sqrt{x+1}$

$f'(x) = x^2 - 1$

$f^{-1}(f(x)) = (\sqrt{x+1})^2 - 1$

$= x + 1 - 1$

$= x$

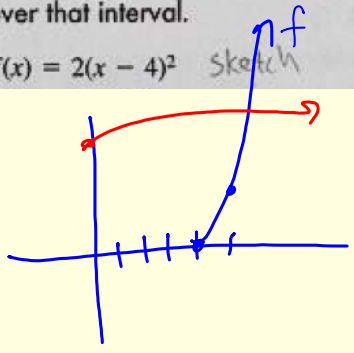
$f(f^{-1}(x)) = \sqrt{x^2 - 1 + 1}$

$= \sqrt{x^2}$

$= x$

In Exercises 59–62, restrict the domain of the function f to an interval where the function is increasing and determine f^{-1} over that interval.

59. $f(x) = 2(x-4)^2$ sketch



d: $x \geq 4$

$y \geq 0$

In Exercises 63–70, let

$f(x) = 3 - 2x$, $g(x) = \sqrt{x}$, and $h(x) = 3x^2 + 2$

and find the indicated value.

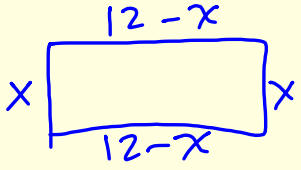
63. $(f - g)(4)$

67. $(h \circ g)(7)$

73. z varies directly as the square of x and inversely as y. ($z = 16$ when $x = 5$ and $y = 2$.)

$$z = \frac{kx^2}{y}$$

77. A wire 24 inches long is to be cut into four pieces to form a rectangle whose shortest side has a length of x. Express the area A of the rectangle as a function of x. Determine the domain of the function and sketch its graph over that domain.



$$\frac{24 - 2x}{2}$$

$$A(x) = x(12 - x)$$
$$A(x) = -x^2 + 12x$$

HW: Review WS

(Follows this slide)

SL Book Monday

Test: Next Thursday and Friday

Covers: PC 2 and SL 3, 5, & 6

PC A Review PC 2/SL 3,5,6

1. State the domain and range of the following relations.

a) $\{(x,y): y^2 = x, x \geq 1\}$

b) $y = \sqrt{x}, 1 \leq x \leq 25$

c) $y = \frac{4}{x+1}, x > 0$

2. Determine the implied domain for each of the following relations.

i) $y = \frac{a}{\sqrt{x}-a}, a > 0$

ii) $y = \sqrt{16-x^2}$

3. Find the range of the following relations.

a) $y = \frac{ab}{x+1}, x \geq 0, ab > 0$

b) $y = \frac{2a}{\sqrt{a^2-x}}, a < 0$

4. A function is defined as follows, $f: x \mapsto 2x+3, x \geq 0$.

(a) Find the value of $f(0), f(1)$.

(b) Find $\{x: f(x) = 9\}$.

(c) Evaluate the expressions

i) $f(x+a)$

ii) $f(x+a) - f(x)$

5. All of the following functions are mappings of $\mathbb{R} \mapsto \mathbb{R}$ unless otherwise stated.

(a) Determine the composite functions $(fog)(x)$ and $(gof)(x)$, if they exist

(b) For the composite functions in (a) that do exist, find their range.

$f(x) = (x+2)^2, g(x) = x-2$

$f(x) = x^3 - 2, g(x) = |x+2|$

6. Find x so that the distance between points (-2, 1) and (x, -3) is $4\sqrt{2}$.

Factoring Trinomials (a > 1)

Factor each completely.

1) $3p^2 - 2p - 5$

2) $2n^2 + 3n - 9$

3) $3n^2 - 8n + 4$

4) $5n^2 + 19n + 12$

5) $2v^2 + 11v + 5$

6) $2n^2 + 5n + 2$

7) $7a^2 + 53a + 28$

8) $9k^2 + 66k + 21$